

Edithvale and Bonbeach Level Crossing removal project

Report of Mark Stuckey

1 Introduction

My firm **Environmental Earth Sciences** prepared the technical review titled **Independent Peer Review (IPR) of Contaminated Land (CL) and Coastal Acid Sulfate Soils (CASS) Technical Report for the Edithvale and Bonbeach Level Crossing Removal Projects (Technical Review)** which is included as Appendix M of Technical Report C to the Environment Effects Statement (EES) for the Edithvale and Bonbeach Level Crossing Removal Project (**Project**).

The role that I had in preparing the IPR Technical Review was lead author.

The role I had in the preparation of Technical Report C was as the independent technical peer reviewer. As part of the review process (and as detailed in Appendix A(e) of this report) I was involved in the Project from the Kick-Off meeting held on 8 June 2017, and initially reviewed the four existing relevant reports for the Project (CL/ PASS Desktop Assessment and Preliminary Impact Assessment: Groundwater, each for Edithvale and Bonbeach). I then reviewed and provided comments on the scoping document for the proposed works (a process which ran from 22 June to 17 July 2017). Subsequently I visited the site during soil and groundwater sampling fieldworks on 27 July 2017, and reviewed three iterations of the draft Technical Report C between 3 August and 19 December 2017.

Following completion of these tasks I provided my Technical Review, stating that the works performed were of appropriate standard (relevant standards listed in Section 10 of my Technical Review) such that Technical Report C provides conclusions and recommendations (Environmental Performance Requirements, EPRs) that are supported by a robust investigation. Hence it is my view that the works can proceed to the detailed design stage, based on the findings and recommendations of the EES relating to CL and CASS, and as detailed in the EPRs of EES Technical Report C.

I therefore adopt the Technical Review, in combination with this document, as my written expert evidence for the purposes of the Edithvale and Bonbeach Level Crossing removal project Inquiry and Advisory Committee's review of the EES and draft planning scheme amendment.

2 Qualifications and experience

Appendix A contains a statement setting out my qualifications and experience, and the other matters raised by Planning Panels Victoria 'Guide to Expert Evidence'.

A copy of my curriculum vitae is provided in Appendix B.

3 Further work since preparation of the Technical Review

Since the Technical Review was finalised (on 24 January 2018), I have not undertaken any further work in relation to the matters addressed in the Technical Review relevant to the Project. I was asked to reconsider whether further soil and groundwater investigation is necessary prior to the detailed design stage of the project, in particular to identify the presence of any groundwater plumes that may be impacted by the Project. In summary, it remains my position that the CL and CASS works performed to date are appropriate to allow the project to proceed to the detailed design stage without further soil or groundwater investigation.

The primary reason for this position is that the CL and CASS work completed to date has used best practice methodologies in an attempt to identify all potential issues, hence further investigation works are not necessary at this stage for the purposes of the EES. Rather, as part of the actual works (including pre-works), measures will be implemented to manage issues associated with CL and CASS, including implementation of a baseline groundwater quality assessment “at least three months prior to the commencement of construction works”.

4 Instructions

The scope of works that I personally undertook was in two stages: as IPR; and as Expert Witness.

The final IPR scope of works was provided by AECOM-GHD JV to me on 17 July 2017, and detailed the following purpose and role:

- The role of the Peer Reviewer is to provide an IPR of the CASS technical impact assessment produced by the JV for the Edithvale and Bonbeach level crossing removal EES.
- In particular, the review should assess the design of and adequacy of the CASS technical assessment to identify and assess the potential environmental effects of the projects.
- The peer review should consider:
 - relevant legislation and policy
 - consistency of methodology with good industry practice, including the availability of relevant data sets and research
 - the approach to field work, data collection and analysis
 - the assumptions and integrity of the data used in the assessment
 - confirmation that the conclusions of the assessment and any proposed mitigation are sound and reasonable and practicable.

The Expert Witness scope of works was provided by Clayton Utz to me on 29 March 2018, and detailed the following requirements in terms of this report:

- Review the public submissions relevant to my area of expertise.
- Prepare an expert report that:
 - responds to the public submissions relevant to my area of expertise
 - addresses my previous IPR Technical Review report and any changes required arising out of the issues raised in the public submissions
 - addresses any other matter that I consider relevant to my area of expertise.

5 Sequence of tasks

The sequence of tasks and process for undertaking my peer review are outlined below:

1. My initial instructions were to perform a review of all relevant legislation and guidance relating to CL and CASS, along with a detailed review of the IPR protocols (see below) – these tasks were performed by me and my specialist support team (see Appendix A(d)). In addition, a kick-off meeting was held on 8 June 2017, the primary purpose of which was to detail the scope requirements for both the JV CASS and CL investigations and the IPR.
 - a. The IPR protocols detail that the independent peer reviewer is required to:
 - i. conduct all communication through my JV contacts
 - ii. ensure the integrity, independence and professionalism of the peer review process, and immediately advise the JV of any potential, perceived or real risk to that independence

- iii. issue letter reports for interim deliverables such as scope and methodology review/s
 - iv. issue a formal report summarising the review of Technical Report C, addressing the purpose and role detailed in Section 4 above
 - v. agree to timeframes in advance and provide at least three days notice where these timeframes cannot be met.
2. CASS Stage A: review of the scope of assessment (one document titled ‘Provision of Technical Services – Indicative CASS scope’ was provided to me on 22 June 2017) and existing reports (four documents – desktop CL/ CASS assessments and preliminary groundwater impact assessments for Edithvale and Bonbeach). I subsequently provided comments relating to Stage A on 4 July 2017, which were addressed by AECOM-GHD JV on 14 July 2017, and I then provided a final agreement to the scoping document on 17 July 2017.
3. Site visit – CASS Stages B and C included a visit to the site by myself on 27 July 2017, which included a traverse of the alignment and surrounding areas, and observation of soil and groundwater sampling procedures.
4. Review/ correspondence – following completion of the data collection component of the program (CASS Stages A to C), CASS Stage D commenced on 3 August 2017 with provision of the draft technical report titled ‘Contamination and Spoil Management Impact Assessment’. I provided comments on this report to AECOM-GHD JV on 30 August 2017. Subsequently the draft ‘Contamination and Acid Sulfate Soils Technical Report’ was provided to me on 18 October 2017. I responded with comments on the report on 2 November 2017 (via email), with a formal response letter provided on 3 November 2017. My comments were discussed at length via phone calls with Navjot Kaur of the JV on 24 November and 6 December 2017. A formal response to my comments of 2/3 November 2017 was received from the JV on 13 December 2017, and I then provided confirmation that all outstanding comments had been appropriately addressed on 19 December 2017. The final IPR Technical Review report was provided to the JV on 24 January 2018.

6 Relevant Environmental Performance Requirements (EPRs)

All EPRs listed in Technical Report C to the EES are relevant to the IPR review. These are:

- EPR CL1 – Spoil Management Plan – Construction Phase
- EPR CL2 – Acid Sulfate Soil Management Plan – Construction Phase
- EPR CL3 – Waste Management – Construction Phase
- EPR CL4 – Acidic and/or contaminated groundwater (construction) – Construction Phase
- EPR CL5 – Acidic and/or contaminated groundwater (operation) – Detailed Design and Operation Phases
- EPR GW1 – Rail trench design – Detailed Design, Construction and Operation Phases
- EPR GW2 – Groundwater performance outcomes – Detailed Design, Construction and Operation Phases
- EPR GW3 – Groundwater Management and Monitoring Plan – Detailed Design, Construction and Operation Phases
- EPR GW4 – Independent Peer Review – Design and Construction Phases
- EPR SC1 – Community and Stakeholder Engagement Management Plan – Design and Construction Phases.

The key EPRs that have been highlighted as being particularly critical to the successful performance of the Project are listed as follows.

EPR CL4 – Development and implementation of measures to manage acidic and/ or contaminated groundwater prior to and during construction, including a pre-works baseline groundwater quality assessment, contaminated plume management (if required), and groundwater treatment and monitoring measures.

EPR CL5 – Development and implementation of measures to manage acidic and/ or contaminated groundwater during operation, including a Groundwater Quality Mitigation Plan for on- and potentially off-site areas.

EPR GW2 – Design of the rail trenches such that mounding and drawdown impacts are mitigated, and degradation of quality and potential impacts to groundwater dependent ecosystems is prevented.

EPR GW3 – Development and implementation of a Groundwater Management and Monitoring Plan for a period of at least 10 years following completion of the construction works.

7 Written submissions

7.1 Submissions Received

I have read the public submissions to the EES and draft planning scheme amendment, and identified those that are relevant to Technical Report C and my area of expertise. These include the following submissions:

Submissions 1, 2, 121, 147, 186, 207 (EPA Victoria), 213, 226 (City of Kingston), 235 (Port Phillip Conservation Council), 242, 246 and 248.

7.2 Summary of Issues Raised

The submissions have raised the following issues relevant to my area of expertise:

1. Potential lowering of groundwater levels resulting in the activation of CASS/ PASS
– Submissions 1, 2, 121, 147, 186, 207, 213, 226, 235, 242, 246.
2. Potential alteration of groundwater flow directions impacting on contaminated plume movements and potentially impacting on (previously unaffected) beneficial uses and receptors
– Submissions 207, 226, 248.

As is indicated above, a number of the submissions received have expressed concerns with respect to the potential for the proposed works to lower the water-table. I have assumed for these submissions that they are therefore relevant to CASS/ PASS activation, even though only submission 207 (from EPA Victoria) specifically mentions or refers to CASS/ PASS/ acid sulfate soil. Based on this, please see below a detailed discussion on the EPA Victoria submission, which also covers all issues raised in all other submissions listed above relating to water-table lowering.

Submissions which raise alteration of groundwater flow-paths as a concern (207, 226 and 248), as listed above, are also discussed further below. In respect of matters relating to groundwater physical behaviour as a result of the proposed works, I defer to the opinions of the groundwater experts.

EPA Victoria provided a detailed response (Submission 207) and indicated that it “supports the engagement of an Independent Reviewer and an Environmental Auditor”. It also “agrees with the risks identified in the EES in relation to: contaminated land, acid sulfate soils, groundwater quality” and states that “the proposed performance requirements and mitigation measures are considered reasonable and practicable”.

The EPA has highlighted the following issues:

- the need to develop the Spoil Management Plan (SMP, EPR CL1) in consultation with the regulator, and to allow sufficient time for the necessary approvals to be considered
- to also develop the Acid Sulfate Soil Management Plan (ASSMP, EPR CL2) in consultation with EPA
- EPA also recommended “further site-specific data is collected on potential soil and groundwater contamination to better inform the risk assessment and development of mitigation measures” (EPR CL4) “on: groundwater quality, water table levels, groundwater flow velocity and flow direction” ... “prior to the commencement of construction works” (EPR GW3)
- EPA also requested that it be provided the opportunity to review the Groundwater Quality Mitigation/ Management Plan (GQMP) to be developed for the project (EPR CL5)
- the detailed plan of how the rail trench design (EPR GW1) will not result in a negative effect of groundwater mounding or drawdown as described in EPR GW2 is expected to be provided to EPA for review, along with timescales for ongoing monitoring, and planned trigger levels and mitigation measures (expected to be included in EPR GW3) should “the proposed groundwater management system not perform as predicted or intended”
- EPA expects that information collected as part of the planned additional investigations (to be performed under EPR CL4) will inform the Groundwater Management and Monitoring Plan (EPR GW3), which will also be provided to EPA for review
- the plan for independent peer reviewer/s (EPR GW4) is endorsed by EPA, and is recommended to include an Environmental Auditor appointed under Section 53 of the EP Act.
 - It is important to note here that EPA recommends the GQMP to be developed under EPR CL5 (to maintain or manage, and mitigate any impacts to, beneficial uses of groundwater affected by chemical impacts of acidification, contamination or salinity), and the Groundwater Management and Monitoring Plan to be developed under EPR GW3 (to monitor groundwater quality at designated locations and timings against trigger levels that require implementation of the GQMP if identified) be independently reviewed in the context of relevant legislation relating to land and water quality – specifically the SEPPs (State Environment Protection Policies) PMCL (Prevention and Management of Contaminated Land), GoV (Groundwaters of Victoria) and WoV (Waters of Victoria)
 - It is the SEPP GoV, in particular, against which the GQMP chemical triggers will be derived on the basis of beneficial use protection
 - EPA is therefore not recommending that the independent peer reviewer, who is an Environmental Auditor appointed under Section 53 of the EP Act, review the physical aspects of EPR GW3 – this should be performed by an appropriately qualified groundwater expert.

City of Kingston (Submission 226) highlighted the requirement for “further groundwater and soil monitoring for contamination” and queries how landowners will be notified of any potential contamination. It therefore recommends a further EPR be developed for community consultation.

The Mordialloc Beaumaris Conservation League (Submission 248) highlighted the potential for migration of pollution, sourced from putrescible waste disposal sites (“45 waste disposal sites” at “Heatherton, Dingley, Clayton and Springvale” are mentioned), to the Edithvale-Seaford wetlands and Port Phillip Bay at Carrum via groundwater. It also made the point that the “extent of groundwater mounding” associated with the works “would depend on the number of tanked trenches, the length of the trenches and the gap between the trenches”. No specific mention is made in this submission of potential impacts associated with dewatering or water-table lowering.

7.3 Response to Issues Raised

Set out below are my comments and response to the issues raised by the written submissions relevant to the area of my expertise.

I agree with the comments made by EPA Victoria, as detailed in Section 7.2 above. In particular:

- ensuring EPA is consulted at an early stage in the development of the SMP (EPR CL1) and ASSMP (EPR CL2), and is provided the GQMP (EPR CL5) and Groundwater Monitoring and Mitigation Plan (EPR GW3) to review
- EPR CL4 and EPR GW3 include the requirement for collection of further site-specific data prior to the commencement of construction works, and as agreed by EPA in Submission 207, it is also my opinion that
 - the measures required under EPR CL4 are appropriate for assessing and managing acidic, contaminated and/ or saline groundwater prior to and during the construction phase of works, while
 - EPR GW3 proposes appropriate measures for operational phase monitoring and closure, as well as implementation of mitigation measures under EPR CL5 (and EPRs FF7 and FF8) if trigger levels are identified
- that independent peer reviewer/s be appointed (EPR GW4) to review all EPR works during the detailed design and construction phases of the Project, which includes
 - an appropriately qualified groundwater expert to review the physical aspects of the Project (EPR GW4a and aspects of GW4b), and
 - an Environmental Auditor appointed under Section 53 of the EP Act to review the chemical aspects of the Project in relation to beneficial use protection under the SEPPs PMCL, GoV and WoV (EPR GW4b and aspects of EPR GW4a).

It is my view that, in response to the City of Kingston Submission 226, the requirement for further groundwater and soil assessment as part of the project is adequately addressed by EPR CL1-5 and GW3, and community consultation is addressed by EPR SC1.

It is my view that in response to the Mordialloc Beaumaris Conservation League Submission 248:

- any pollution of groundwater associated with putrescible waste disposal sites would have been identified in Technical Report C, and further, will be identified as part of EPR CL4
 - No such pollution was identified in Technical Report C, which is consistent with the conceptual site model (CSM) for the site identifying all “potential sources of contamination within or near the study areas” (Technical Report C, Section 4.1.2)
 - The distance of the listed localities of Heatherton, Dingley, Clayton and Springvale are approximately 8km, 6km, 11km and 10km respectively from the proposed alignment and as such (as indicated above in relation to the CSM developed for the Project) are both: extremely unlikely to be sources of pollution at the site; and impacts would be detected as part of both the completed and planned future works
- the extent of groundwater mounding associated with the physical dimensions of the trenches, and resultant potential cumulative impacts, is adequately addressed by Technical Report A. I defer to the opinions of the groundwater experts with respect to any further comment on the potential cumulative groundwater impacts from the Project.

All issues raised by all other submissions that are relevant to Technical Report C and my area of expertise (Submissions 1, 2, 121, 147, 186, 213, 235, 242 and 246) have been discussed in relation to the EPA Victoria submission (207).

8 Conclusions

It is my view that the current EPRs relevant to my area of expertise (i.e. EPRs CL1-CL5 and EPRs GW1-GW4) are appropriate for the fulfillment of their intended purpose of ensuring all potential environmental effects of the projects are mitigated and/or managed. As such, based on my independent peer review, no changes or amendments to the EPRs are recommended.

It is suggested that the intention of EPR GW4 (independent peer review) could be clarified to confirm that this role should be performed by expert/s in both physical hydrogeology (including the design and operation of the rail trenches and associated passive horizontal drain, and protection of groundwater dependent ecosystems) and hydro-geochemistry (including the protection of all relevant beneficial uses associated with the PMCL, GoV and WoV SEPPs).

Declaration

I have made all the inquiries that I believe are desirable and appropriate and that no matters of significance which I regard as relevant have to my knowledge been withheld from the Inquiry and Advisory Committee.

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Signed

Date: 28 May 2018

Appendix A Matters Raised by PPV Guide to Expert Evidence

- (a) the name and address of the expert;

Mark Stuckey – Unit 3, 1 Ross Street, Newstead, Queensland

- (b) the expert's qualifications and experience;

Mark Stuckey holds tertiary qualifications in agricultural science (majoring in soil science) with over 23 years experience, and has completed a Master of Science (Groundwater Hydrology) and has been a practising hydrogeologist for over 20 years. Mark has published papers and provided presentations in these fields, including identification and management of acid sulfate soil.

Mark is a Certified Professional Soil Scientist (CPSS) as accredited by Soil Science Australia (SSA) with recognised expertise in the fields of contaminated site assessment and management (CSAM) and acid sulfate soil assessment, remediation and management, and has been since 1997. Mark is also an EPA Victoria approved Environmental Auditor (Contaminated Land) appointed pursuant to the Environment Protection Act 1970, and holds similar approvals in NSW (under the Contaminated Land Management Act 1997) and Queensland (under the Environmental Protection Act 1994).

Mark has completed over 120 acid sulfate soil projects, including at sites in Sumatra Indonesia, and in Victoria (including at the nearby Wannarkladdin Wetlands, and sites in Edithvale and Seaford). Mark also provided the draft Best Practice Management Guidelines for Coastal Acid Sulfate Soils in Victoria to the Department of Sustainability and Environment (DSE) in February 2008. Mark has also performed expert witness roles relating to acid sulfate soils, including for sites in Victoria at Yaringa, Barwon Heads and Bulla.

Further detail is provided in CV in Appendix B.

- (c) a statement identifying the expert's area of expertise to make the report;

Mark Stuckey is a senior principal soil scientist, hydrogeologist and risk assessor with Environmental Earth Sciences whose primary fields of expertise are soil science and hydrogeology.

Further detail is provided in CV in Appendix B.

- (d) a statement identifying all other significant contributors to the report and where necessary outlining their expertise;

Mark Stuckey was assisted in this project by Tamara Ashford and Dr Anna Sheldon, who are both Senior Soil Scientists with CPSS accreditation. Robbie Johns also performed internal technical review of documents prepared by me – Robbie is a senior environmental scientist who is a certified environmental practitioner (CEnvP) site contamination specialist (SCS).

- (e) all instructions that define the scope of the report (original and supplementary and whether in writing or oral);

The scope of works that I personally undertook was in two stages: as IPR; and as Expert Witness.

The following IPR scope of works was discussed at the CASS Peer Review Kick-Off meeting held on 8 June 2017, and detailed in Environmental Earth Sciences proposal dated 15 June 2017.

- CASS Stage A: review of the scope of assessment (one document) and existing reports (four documents);
- CASS Stage B – review of soil sampling program and assessment – including site inspection;
- CASS Stage C – review of groundwater sampling program and assessment – including site inspection;
- CASS Stage D – review of CASS hazard assessment;
- Review of contamination assessment and soil hazard categorization and management report for off-site spoil disposal classification;
- Provision of one (1) combined review report (including one round of review comments) for Stages B, C and D, detailing the CASS works conducted and the reviewer’s findings;
- CASS Impact Assessment (IA) – review of one (1) combined Impact Assessment Report including risk assessment and environmental performance requirements (EPRs), with review comments and findings to be incorporated into the above Stages B, C and D review report;
- Attend a Risk Assessment Workshop (if required); and
- Attend a Panel Hearing (if required).

A ‘Provision of Technical Services – Indicative CASS scope’ document was provided to me on 22 June 2017, with my response provided on 4 July 2017. A written response to my comments on the scope was provided by AECOM-GHD JV on 14 July 2017. I gave my final approval of the scope of works on 17 July 2017.

The final IPR Terms of Reference (TOR) was provided by AECOM-GHD JV to me on 17 July 2017, and detailed the following purpose and role:

- The role of the Peer Reviewer is to provide an independent peer review of the Coastal Acid Sulfate Soils (CASS) technical impact assessment produced by the JV for the Edithvale and Bonbeach level crossing removal EES.
- In particular, the review should: assess the design of and adequacy of the CASS technical assessment to identify and assess the potential environmental effects of the projects, and address the scoping requirements (prepared by the Department of Land, Water Environment and Planning (DELWP) for the EES.

The Expert Witness scope of works was provided by Clayton Utz to me on 29 March 2018, and detailed the following requirements in terms of this report:

- Review the public submissions relevant to my area of expertise.
- Prepare an expert report that:
 - responds to the public submissions relevant to my area of expertise
 - addresses my previous IPR Technical Review report and any changes required arising out of the issues raised in the public submissions
 - addresses any other matter that I consider relevant to my area of expertise.

- (f) the identity of the person who carried out any tests or experiments upon which the expert relied in making this report and the qualifications of that person;

Testing was performed by AECOM-GHD staff, including Navjot Kaur, Megan Stanley, Natalie Jiricek, Alan Wilson and Joshua Riley. It is the IPRs assessment of the qualifications of these personnel, and their conduct in the field (Alan and Joshua), that they have the appropriate level of expertise to undertake the works performed.

- (g) a statement setting out the key assumptions made in preparing the report;

The key assumption made in preparing this (and any) review report is that I am not able to supervise all aspects of the work undertaken, and as such I have to rely on the methodologies adopted (in particular field data collection) being carried out in an appropriate and consistent manner. Controls are however in place to assess the quality of data collected, and these controls appear to have been appropriate for the investigations conducted. It was an important component of my review therefore to assess data quality control procedures and results. It is also assumed that all submissions relevant to my area of expertise have been allocated to me.

It is not possible for me to make comment on whether the passive horizontal trench will function effectively, and for what period of time – for an assessment of its likely performance, I have relied on Technical Report A (Appendices E and H in particular) for predicted performance as assessed by numerical groundwater modelling. In respect of matters relating to groundwater physical behaviour as a result of the proposed works (including the function of the passive horizontal trench), I defer to the opinions of the groundwater experts.

- (h) a statement setting out any questions falling outside the expert's expertise and also a statement indicating whether the report is incomplete or inaccurate in any respect.

I haven't responded to any questions outside my area of expertise. To the best of my knowledge, in terms of the instructions received and scope detailed, this report is complete and accurate.

Appendix B CV

Qualifications and Appointments

- Certified Professional Soil Scientist (CPSS) Contaminated Site Assessment & Management (CSAM) Accredited – Soil Science Australia (2018)
- Contaminated Land Auditor in Queensland, pursuant to the *Environmental Protection Act 1994* (2015-2018)
- Environmental Auditor – Contaminated Land in Victoria, pursuant to the *Environment Protection Act 1970* (2016-2018)
- Site Auditor in NSW accredited under the *Contaminated Land Management Act 1997* (2016-2018)
- Environmental Management Systems (EMS) Auditor (2015-2018)
- Suitably Qualified Person (SQP) in Queensland in accordance with the Environmental Protection Act 1994, with “acceptable qualifications and experience to perform work for complex sites including gasworks.”
- Member International Association of Hydrogeologists (MIAH) (2018)
- Australian Contaminated Land Consultants Association (ACLCA) Queensland Branch – Auditor Sub-Committee Member (2016-2018)
- Masters of Science (Groundwater Hydrology) – Flinders University of SA (2006)
- Bachelor of Science in Agriculture (Soil Science Hons) – University of Sydney (1994)

External Training

Technical

- 1st Water in Coal Mines School – International Centre for Excellence in Water Resources Management (ICE WaRM), Brisbane, September 2011
- Ecological Risk Assessment for a Sustainable Environment – online class taught by Dr David Ludwig, University of Massachusetts Boston and the Association for Environmental Health and Sciences (AEHS), September 13 to December 10, 2010
- National Short Course in Environmental Health: Principles of Risk Assessment & Management. South Australian Centre for Public Health (2009)
- 9th Groundwater Modelling School: Numerical, Analytical, Solute Transport (2008)
- 4th Aquifer Storage & Recovery National Workshop: management of aquifer recharge (2004)
- 16th & 26th Australian Groundwater Schools (Fundamentals of Groundwater Science, Technology & Management) (1997 & 2004)
- Investigations for Contaminant Geoscience & Introduction to Site Remediation (2004)
- 1st Soil & Groundwater Pollution (Investigation, Remediation & Risk Assessment) Course (2003)

Health and Safety

- Senior First Aid Certificate, 1995-2015
- OH&S Induction Training – CFMEU ‘Red Card’, 2004

Skills

Mark has extensive experience with and has been involved in:

- Hydro-geochemistry and investigation of groundwater resources;

- Soil methodology, characterization and chemistry;
- Waste rock geochemistry;
- Groundwater/soil interaction;
- Acid sulfate soil assessment and management; and
- Risk assessment & groundwater mass, solute fate & transport modelling.

Employment History

Environmental Earth Sciences, Senior Principal Soil Scientist, Hydrogeologist & Risk Assessor (Jun 2017-Current)

Environmental Earth Sciences, Principal Soil Scientist, Hydrogeologist & Risk Assessor (Dec 2005-Jun 2017)

Environmental Earth Sciences, Senior Soil Scientist & Hydrogeologist (Jan 2001-Nov 2005)

Environmental & Earth Sciences, Senior Soil Scientist (Nov 1998-Dec 2000)

Environmental & Earth Sciences, Soil Scientist (March 1995-Nov 1998)

Based in Sydney from March 1995-Oct 2002, Melbourne Oct 2002-March 2008, and Brisbane from March 2008

Professional Affiliations

Soil Science Australia (SSA)

International Association of Hydrogeologists (IAH)

The Association for Environmental Health and Sciences (AEHS)

Australian Contaminated Land Consultants Association (ACLCA)

Project Summaries

Completed Environmental Audits

Bundi (via Roma), Jimboomba, Sherwood, Milman (via Rockhampton), Proserpine, Toowoomba, Eden's Landing, Fortitude Valley, QLD – certification of removal of land from the Environmental Management Register (EMR)

Emerald, QLD – certification that land is suitable for unrestricted use

Pinkenba, QLD – certification that land is suitable for restricted uses

Suncorp Stadium, Milton, QLD – certification of amendment to Site Management Plan (SMP)

Coorparoo and Coochin Creek, QLD – certification of compliance with Environmental Evaluation (EE) Notices, former drycleaners and burning of CCA treated timber

Port Melbourne, VIC – statement of environmental audit (SoEA), high density residential development with auditor determined CUTEF

Glen Waverly, VIC – certificate of environmental audit (CoEA), residential development

Footscray, VIC – Auditor verification of Statement Conditions

On-going Environmental Audits

Projects in NSW: Richmond RAAF Base PFAS, Sydney Park development on landfill, Byron Bay development on mineral sands, Camden milk factory development, Surry Hills residential development, South Hurstville school site development

Projects in Victoria: Elsternwick and Thomastown residential developments, Bendigo compliance with Statement conditions

Projects in Queensland: Redcliffe rugby league club landfill, Proserpine quarry, service stations at Murrumba Downs, Dayboro and Mango Hill, Bruce Highway Upgrade Project PFAS, Algester and City residential developments, Gladstone caustic spill, Toowoomba Regional Council Works Depot divestment, fuel depot PFAS at Kingaroy and Mareeba, Salisbury printers

Projects in Northern Territory: Darwin waterfront hotel development

Expert Witness

Projects in NSW: Wagga Wagga (soil science and hydrogeological advice, proposed piggery), Hill Top (advice relating to contamination issues at a shooting range), Byron Bay (groundwater supply advice relating to freeway expansion), Nelson Bay (expert report and evidence on aquifer storm-water injection system), Barangaroo (expert opinion review team on Hickson Road gasworks contamination)

Projects in Victoria: Bulla/ Barwon Heads/ Yaringa/ LXRA Edithvale and Bonbeach (acid sulfate soil statement of evidence), Dutson Downs (statement of evidence for VCAT appeal, Soil Organic Recycling Facility), Douglas (independent technical review of in-pit mineral by-products disposal), Skipton (expert report and evidence, Planning Panels Victoria, groundwater/ spring impact assessment)

Projects in Queensland: Carrara (expert witness on acid sulfate soil for regulator, golf course development), Chinchilla (peer review of investigation into leakage from underground coal gasification), Herberton (independent technical review on acid leakage from tin mine)

Per- and poly-fluoroalkyl substances (PFAS) Projects

RAAF Richmond, NSW (Site Auditor/ Technical Advisor, 2017-current)

RAAF Williamtown, NSW (Principal Technical Advisor to Principal Contractors [Lendlease and CPB] for NACC/ WLMR2 development works, 2015-current)

RAAF Tindal, NT (Principal Technical Advisor to Principal Contractor [Lendlease] for NACC development works, 2016-current)

Jervis Bay Airfield, NSW (JBAF) (Technical Principal, 2016-2017)

HMAS Albatross Nowra, NSW (AFFF spill response and management/ assessment, 2016)

Gold Coast Airport, QLD (Soil and Groundwater Trigger Assessment, ILS & PLIFT Projects, 2015-2016)

Bruce Highway Upgrade Project, Caloundra-Sunshine Motorway, QLD (Contaminated Land Auditor, 2017-current)

AACO Oakey (QLD), RAAF Edinburgh (SA), RAAF Tindal (NT) and RAAF Williamtown (NSW) Conceptual Hydrogeological Models for proposed water treatment plants (2018)

Kingaroy and Mareeba fuel depot decommissioning investigations (2018)

Projects Achieving Removal of Sites from the QLD EMR as SQP

Kingaroy (2009 – former machinery workshop and service station), Bundaberg (2009 – former service station), Kelvin Grove (2009 – former printers), Cannon Hill (2010 – former fuel depot), Morayfield (2010 – fuel storage), Bardon (2011 – former service station), Toowoomba (2012 – fuel storage), Zillmere (2014 – former printers), Salisbury (2015 – former transport depot), Murgon (2015 – abattoir), Woolloongabba (2015 – service station), Mackay (2015 – Council depot), Kedron (2016 – service station)

Soil, Soil Vapour and Groundwater Contamination Studies

Projects in NSW/ ACT: Williamtown (PFAS at RAAF Base Williamtown), Gore Hill (ABC television site), Granville (battery manufacturing facility), Coffs Harbour (fuel spill at airport), Botany Basin (numerous studies), Revesby (bitumen manufacturing plant), Kingsgrove (former gasholder), Cherrybrook (uncontrolled fill site), Sydney Harbour Bridge (lead studies of Bradfield and Dawes Point parks), Bathurst/ Glenn Innes/ Tenterfield/ Dungog/ Grafton (timber treatment plants), Pennant Hills/ Lindfield/ Blacktown/ Randwick/ Coonamble/ Lyons ACT (service stations), Fyshwick (soil and groundwater assessment of a former dry cleaning facility), Catherine Hill Bay (soil and groundwater assessment of a former colliery)

Projects in Victoria: Dutson Downs (waste-disposal site), Yarraville (sugar refinery and distillery), Gippsland (Regional Outfall Sewer), Clayton, Lakes Entrance (abandoned oil exploration well site), Flemington/ Craigieburn/ Deer Park/ Caroline Springs/ Langwarrin/ Leopold/ Tarneit/ East Melbourne/ South Yarra/ Armadale/ South Melbourne/ Albert Park (children's services sites), Bayswater, South Kingsville (PCE, TCE, DCE, active manufacturing plants)

Projects in Queensland: Gold Coast Airport (PFAS at ILS and PLIFT projects), Cairns/ Mackay Airports, Rockhampton/ Takura/ Wacol (timber treatment plants), Maryborough (foundry), Sunnybank Hills, Hervey Bay/ Maryborough/ Rockhampton/ Townsville/ Gin Gin/ Brendale (electricity substations), Toowoomba, Toowong, Arundel, Townsville Port, Raceview, Bulimba, Fortitude Valley, Hamilton (asbestos in soil)

Projects in Western Australia: Perth (former galvanizing plant)

Projects in Northern Territory: Tindal (PFAS at RAAF Base for NACC development), Yuendumu (roadside cyanide spill), Darwin (Francis Bay detailed assessment)

Projects in New Zealand: Onehunga (metal recycling facility), Otahuhu (hydrogeological review of Nufarm former fertilizer manufacturing and NZL Group Limited sites), Waitakere (groundwater monitoring of Kay Road Balefill)

Groundwater Contamination and Remediation Studies

Projects in NSW: Coffs Harbour (groundwater and soil vapour assessment of a benzene plume, and implementation of an enhanced biodegradation program), Arncliffe (groundwater study of a TCE spill at a former asphalt batching plant), Alexandria (hydrogeological assessment, arsenic plume, Botany Sands on Shea's Ck)

Projects in Victoria: Moe, Morwell (groundwater assessment of Waste Water Treatment Plants), McCrae (nutrient injection, characterization/ modelling of nitrogen plume in unconfined aquifer, followed by phyto-remediation study), West Footscray (groundwater contamination study, LNAPL and DNAPL impacted site on fractured basalt with an in-filled quarry), Moorabbin (groundwater assessment to validate solvent release remediation, including nutrient injection into an aquifer and subsequent monitoring), Hughesdale (hydrogeological investigation and risk assessment, service station), Springvale (hydrogeological assessment of stratified chemical impacts from a TCE plume on the Brighton Group aquifer)

Projects in Queensland: Kingaroy (hydrogeological assessment and remediation of a TPH plume, former service station and waste disposal well), Archerfield (study on fate & transport of a solvent plume, asphalt batching plant)

Gasworks assessment and remediation experience (22 sites)

Wagga Wagga Tarcutta St NSW – principal hydrogeologist/ risk assessor for assessment

Queenscliff VIC, Katoomba, Yass NSW – principal hydrogeologist for assessments

Portland, Hamilton, Warrnambool VIC, Kingsgrove NSW – project director for assessments

Colac, Horsham, Stawell, Ararat, Castlemaine VIC – principal hydrogeologist/ risk assessor for detailed hydrogeological and health/ ecological risk assessments post-remediation

Mudgee NSW, West Melbourne VIC, Hull UK – managed bioremediation process, including chemical fingerprinting characterization for gasworks remediation projects

Bathurst, Lithgow NSW, South Melbourne, Fitzroy VIC – project director and principal hydrogeologist for assessments

North Melbourne VIC, Cootamundra and Molong NSW – project director, principal hydrogeologist and risk assessor for assessments and remediation

Soil remediation

International: Hull, UK (soil bioremediation at the former gasworks, Clough Road)

Projects in NSW: St Peters (bioremediation and validation of a former bitumen emulsion plant), Coffs Harbour (grease and oil pond bioremediation and validation), Arncliffe (remediation of contamination hotspots on a residential development), Kurnell/ Grafton (bioremediation of creosote impacted soil)

Projects in Victoria: Dandenong (remediation of the former Dandenong Sewage Treatment Plant), Sunshine West (chemical stabilization study for lead immobilization and on-site re-use), Brighton (assessment, remediation and validation, former service station site)

Projects in Queensland: Rockhampton/ Takura (timber treatment plants, including creosote bioremediation), Kingaroy (demolition/ remediation of a former service station and industrial site), Cannon Hill (assessment, remediation and validation of former fuel depot), Bundaberg (assessment, remediation and validation, former service station)

Projects in South Australia: Whyalla (soil bioremediation treatment, steel mill)

Projects in Tasmania: Bushy Park (investigation and remediation, timber treatment plant)

Human Health and Environmental Risk Assessments

Projects in NSW: Bundarra (metals risk-based assessment, Gwydir River bridge surrounds), Coramba (risk evaluation of petroleum impacts on drinking water supply), Camellia (risk assessment of carbon tetrachloride/ chloroform/ CrVI impacted site, including vapour risk assessment), Randwick (risk-based assessment of soil, soil-vapour, groundwater and air quality on four adjacent properties), Wagga Wagga (risk-based soil vapour assessment, Tarcutta Street gasworks), Cootamundra (health and ecological risk assessment of gasworks remediated soil), Molong (health and ecological risk assessment of former gasworks site), Williamstown (occupational exposure risk assessment for PFAS at NACC and WLMR2 development sites)

Projects in Victoria: Ballarat (arsenic impacted former mine tailings site), Docklands (West Melbourne gasworks), South Yarra (risk-based assessments (2) of soil VOC vapour levels for developments underlain by an unidentified LNAPL plume), Springvale (risk-based assessment of PCB and Dioxin impacted site), Armadale/ South Melbourne/ Albert Park/ South Yarra/ East Melbourne (risk-based assessment of soil at children's services centres), Brunswick East (risk-based assessment of soil and groundwater VOC vapour levels, and soil lead and PAH concentrations, for a residential development), Braybrook (risk-based assessment for soil vapour migration to off-site receptors), North Melbourne (risk assessment for soil vapour migration, former gas-holder), West Melbourne (risk assessment for on-site re-use, Dynon Port rail link project), East Malvern (human health and ecological risk-based assessment for former in-filled quarry), Newport (medium- to high-density residential development on a former timber yard/ in-filled quarry), Maribyrnong (preliminary and detailed risk-based assessment, former Defence facility), Bendigo (risk assessment for arsenic in soil on a residential development), Northcote (railway corridor), Deer Park (arsenic in rail corridor), Castlemaine (ecological risk-based assessment, former rifle range and foundry waste dumping ground), Maidstone (risk-based assessment of TCE/ DCM/ TCFM plume migration via groundwater to off-site receptors), Ballan (QRA for petroleum plume)

Projects in Queensland: Takura (health and ecological risk-based assessment, and remediation criteria development, timber treatment plant), Bardon (former service station), Townsville (environmental risk-based assessment of groundwater impacts on Stuart Creek from copper refinery discharge), Yurbi (environmental evaluation and risk based assessments for soil, surface water and groundwater, concentrate ore rail loading facility), McKinlay (health and ecological risk-based assessment, mine site roadside soil)

Projects in South Australia: Seaford (risk-based assessment & remedial methodology, former shooting range)

Projects in Northern Territory: Tindal (occupational exposure risk assessment for PFAS at NACC development site)

Projects in Tasmania: Bell Bay (risk assessment manganese smelter fume and mud)

International: Hastings, NZ (risk-based assessment on arsenic levels in soil), Altos de Copaquilla, Chile (human health risk assessment of mine spoil and heap leach piles)

Hydrogeology

Projects in NSW: Coffs Harbour (24-hour constant discharge and recovery test to design remedial program based on aquifer parameters), Mangrove Mountain (3-day constant discharge/recovery test, aquifer evaluation for increased resource allocation), Kandos (Packer Testing of karst system at a limestone quarry and surrounds), Nelson Bay (detailed study for a storm-water re-injection feasibility project), Revesby (slug and constant discharge tests), Camellia (review of extraction system and dewatering trial for bulk excavation works to 12 m depth), Molong (Packer and Constant Discharge Testing of karst aquifer system, former gasworks), Ewingsdale (hydrogeological assessment for freeway expansion impacts), Canbelego (dewatering and water supply predictions using an analytical model), Cobar (water supply for a silver mine, including exploration and 7-day constant discharge and recovery tests), Cobar (review of groundwater, surface water, sediment and soil data, Endeavor Mine), Toongi (hydrogeological assessment for proposed Dubbo zirconia project)

Projects in Victoria: Colac (24-hour constant discharge and recovery test to assess remedial options for dissolved gasworks NAPL plume in a wedge-shaped aquifer bound by a marl aquitard), Horsham (22½-hour constant discharge and recovery test to assess remedial options for dissolved plume migration from a former gas-works site), Stawell (44 individual slug-tests in a fractured rock aquifer to determine heterogeneity as a function of dissolved chemical migration from a former gas-works), Dutson Downs (installation of 20 and assessment of 50 groundwater monitoring bores to determine potential impacts of waste disposal on regional aquifer systems), South Yarra (6-hour constant discharge, step draw-down and recovery test to model dewatering requirements for basement car-park in Brighton Group aquifer), Maidstone (8-hour constant discharge test in the Newer Volcanics Upper Basalt formation to determine remedial requirements for dissolved and free-phase chemicals)

Projects in Queensland: Townsville (24-hour constant discharge & recovery test to assess potential impacts of a groundwater plume at a metal refinery), Bli Bli (review of groundwater flow model for water usage at a proposed golf course)

Projects in Northern Territory: Nolan's Bore via Aileron (installation of abstraction and observation wells, followed by a 4-step drawdown test, 7-day constant discharge test & 7-day recovery test to assess in pit dewatering requirements for future open cut mine), Central Tanami (hydrogeological assessment for proposed gold mine expansion)

Hydro-geochemistry and solute transport assessment

Projects in NSW: Coffs Harbour (service station, enhanced biodegradation), Kandos (groundwater monitoring at a limestone quarry and surrounds), Arncliffe (asphalt batching plant TCE plume), Revesby (bitumen manufacturing plant), Camellia (carbon tetrachloride/ chloroform spill), Molong/ Cootamundra/ Katoomba/ Bathurst/ Lithgow/ Tarcutta Street Wagga Wagga/ Yass/ Grenfell (gasworks), Wollongong/ Byron Bay/ Narrung Street, Wagga Wagga (wastewater treatment plants), Canbelego (installation and monitoring of a groundwater network for a gold mine), Alexandria (arsenic and TPH plumes in Botany Sands on Shea's Creek), Dapto (metals migration from a slag heap)

Projects in Victoria: Colac/ Horsham/ Stawell/ Castlemaine/ Ararat/ North Melbourne (gasworks remediation), Moe/ Morwell/ Seaspray/ Dandenong/ Werribee (wastewater treatment plants), McCrae (service station, nutrient injection, phytoremediation), West Footscray (LNAPL/ DNAPL), Moorabbin/ Springvale/ Sunshine West/ Braybrook/ Maidstone (solvents/ TCE), Hughesdale/ Flemington/ Clayton (service stations), Morwell (coal mine overburden dump monitoring and GQMP), Mentone (BTEX, phthalates, GQMP), Dutson Downs (waste disposal site), Maffra (dry cleaners – PCE/ TCE/ DCE/ VC), Prahran (service station with CUTEF/ GQMP), Southern Victoria Defence facilities

Projects in Queensland: Kingaroy (service station and machinery workshop with waste disposal well), Archerfield (asphalt batching plant TCE/ PCE/ DCE/ VC plume), Townsville (copper refinery discharge and port facility acid sulfur plume), Bardon (former service station, TPH/ BTEX plume), Mt White (hydrogeological assessment of a gold mine), South Blackwater (impact of acid drainage on groundwater quality), Chinchilla (groundwater monitoring for CSG process water irrigation scheme)

Projects in South Australia: Kilburn (former galvanizing and metal processing plant)

Landfill monitoring and assessment (groundwater, landfill gas)

Projects in NSW: Londonderry, Wetherill Park, Shellharbour (1995-current), Glenfield, Lithgow, Inverell (2000-current), Walcha, Bega (5 sites), Gregadoo, Forest Hill

Projects in Victoria: Nunawading, Frankston, Green Gully, Dandenong (2006-current), Altona North, Grantville, Rhyll, Wonthaggi

Projects in Queensland: Scenic Rim Regional Council (5 landfills, 2005-current), Logan City Council (6 landfills, 2004-current), City of Gold Coast (7 landfills, 2014-current)

Mining

Wetar Island, Indonesia: assessment of gold mine pit and waste dump leakage

Projects in NSW: Ardlethan (environmental compliance, water re-use and tailings deposition strategy, alluvial tin mine), Yerranderie (field investigation, mine adit survey and risk evaluation of former silver mining field), Kandos (groundwater assessment of karst system at a limestone quarry and surrounds), Canbelego (dewatering, water supply and groundwater monitoring at a gold mine), Cobar (water supply for a silver mine), Helensburgh (hydrogeological and hydrogeochemical assessment of ‘deep’ groundwater aquifers due to subsidence and dewatering), Toongi (hydrogeological assessment for proposed Dubbo Zirconia Project)

Projects in Victoria: Yallourn (assessment of chemical impacts on sediment and water in open cut coal mine ponds), Morwell (coal mine overburden dump and surrounds groundwater monitoring)

Projects in Queensland: Einasleigh (characterisation of waste rock samples from Kaiser Bill project), Mt White (hydrogeological assessment of a gold mine), South Blackwater (acid drainage studies), Townsville (assessment and remediation of evaporation pond leakage groundwater impacts), Townsville Port (assessment of soil for Pb/Zn concentrate impacts, and assessment of groundwater for acid sulfur plume), Yurbi (environmental evaluation and risk assessments for soil, surface water and groundwater, concentrate ore rail loading facility), Cannington to McKinlay (health and ecological risk-based assessment, mine site roadside soil), Cracow (hydrogeological and hydrogeochemical review of groundwater data from Gold Mine)

Projects in Northern Territory: Yuendumu (roadside cyanide spill), Nolan’s Bore via Aileron (in pit dewatering requirements for future open cut mine), Macarthur River (independent hydrogeological review of Macarthur River Mine), Central Tanami (hydrogeological assessment for proposed gold mine expansion)

Projects in Tasmania: Bell Bay (risk assessment manganese smelter fume and mud), Rosebery (hydrogeological review, proposed rock dump)

Acid sulfate soil assessment and management

Mukut Palm Oil Plantation, Sumatra, Indonesia: field visits, assessment and assistance with management of issues relating to drainage and palm production

Statewide, Victoria: development with DSE of Best Practice Management Guidelines (BPMG) for the assessment and management of coastal acid sulfate soil (CASS)

Projects in NSW: Port Stephens (catchment-wide), Mascot (M5-East, accelerated weathering trials and development of VENM ‘B’ disposal classification), Banksmeadow (fuel pipeline), Kurnell/ Dunmore (sand mines), Popran Creek, Strathfield (Mason Park Wetlands, including Council training and action plan), Wyong, Kooragang Island, Wollongong (Port Kembla to Bellambi sewer pipeline), Port of Botany Expansion project, Ballina Bypass project, Stockton sand mining expansion

Projects in Victoria: City Link, Patterson Lakes (Wannarkladdin Wetlands), Paynesville (including liming trial), Metung, Lakes Entrance, Nicholson, Port Albert, Docklands (Collins Street extension), Flemington Racecourse, Little River (pipeline), Tooradin, Barwon Heads (Statement of Evidence for VCAT), Kensington, Aberfeldie, Seaford, Maribyrnong, Albert Park, Edithvale, Aspendale (sewer pipeline), Yaringa (marina extension), Koo Wee Rup (road), Edithvale and Bonbeach (LXRA project)

Projects in Queensland: Pinkenba, Bribie Island (x2), Abbot Point, Arundel, Hawthorne, Newstead, Hope Island, Tugun, Carrara, Wynnum-Manly

Projects in South Australia: Port Adelaide, Lonsdale, Adelaide Desalination Plant

Soil, Rock and Water Chemistry Studies

Projects in NSW: Kangaroo Valley (soil fertility assessment)

Projects in Victoria: Dutson Downs (assessment of sludge waste pond for beneficial re-use, & soil chemistry of land for agricultural use), Caroline Springs (lake sediment & water chemistry impacts on aquatic plants), Edgewater (soil fertility assessment for re-vegetation works), Yarra Glen (soil fertility/chemical assessment for organic garden), Ascot Vale (surface water chemistry study for off-site discharge), Melbourne University (pot trials for application of filter waste as soil ameliorant), Walhalla (Hg in river sediment)

Projects in Queensland: Oakey/ Grandchester (soil fertility and salinity assessment for wastewater irrigation to pasture), Rochedale/ Darra/ Deebing (soil classification study to assess regional ecosystem land classification zones), Baralaba (soil and land capability assessment), Chinchilla (soil quality assessment for decommissioning of a CSG water holding dam), Mt Crosby (assessment and remediation of alum spill)

Projects in Western Australia: Lancelin (nutrient irrigation management plans)

Auditor Expert

Projects in Victoria: Clayton (soil chemistry assessment for site beneficial use protection), Yarraville/ Collingwood/ St Kilda/ Preston/ Strathmore/ Mentone/ Mordialloc (soil and hydrogeological assessment and review), Torquay/ Leongatha/ Preston (site audit and assessment for issue of CoEA), South Yarra (site audit and assessment for issue of SoEA), Prahran (site audit including CUTEP submission to EPA and GQMP provision)

Projects in South Australia: Brukunga (soil science and hydrogeology review for audit of mine remediation)

Publications and Presentations

Stuckey, M and Mulvey, P (2013) *Looking for fractures – integrating geochemistry with hydrogeology to find inter-aquifer leakage above dewatered or collapsed coal seams*. The Australasian Institute of Mining and Metallurgy (AusIMM), Publication Series No 12/2013, Water in Mining, November 2013.

Stuckey, M and Mulvey, P (2012) *'Oxidation without neutralisation can be managed – providing you control the rate.'* *Broad-acre agricultural development on acid sulfate soil in south-east Asia (Sumatra, Indonesia)*. Presented at the Third National Acid Sulfate Soils Conference, Melbourne, March 2012.

Stuckey, M and Spinks, A (2012) *The self-buffering capacity of Coode Island Silt (CIS) excavated from areas near Melbourne CBD and stockpiled for over 11 years*. Presented at the Third National Acid Sulfate Soils Conference, Melbourne, March 2012.

Stuckey, M and Sheldon, A (2011) *Arsenic bioavailability and health risk in soil – changing land-use from horticultural to residential (NZ case study)*. Presented at EcoForum, Sydney, March 2011.

Stuckey, M and Boland, L (2011) *A risk-based approach to remediation: lead immobilization through chemical stabilization of waste material*. Presented at EcoForum, Sydney, March 2011.

Stuckey, M and Clutterham, M (2011) *Environmental assessment of rural gasworks in NSW*. Presented at EcoForum, Sydney, March 2011.

Stuckey, M (2010 & 2011) *Acid sulfate soil – case study examples from the consulting industry perspective*. Presented at the Southern Cross Geosciences Professional Short Course in Acid Sulfate Soil, Torquay, Victoria, October 2010 & Sydney, NSW, April 2011.

Adcock, D, Stuckey, M, Mulvey, P, McKay, C and Fitzpatrick, R (2008) *Draft Best practice management guidelines for assessment and management of acid sulfate soils in Victoria*. In: *Draft Strategy for Coastal Acid Sulfate Soils in Victoria*. Department of Sustainability and Environment, Victoria, June 2008.

Stuckey, M (2007) *Hydrogeological behaviour and hydrochemical evolution as a function of dissolved contaminant transport in a 'blind' buried wedge-shaped paleo-lake aquifer*. Presented at the CRC Care Contamination Cleanup 07 Conference, Adelaide, Jun 2007.

Mulvey, P, Stuckey, M, Clark, L and Faurie, J (2007) *Risk-based assessment of a former orchard*. Waste Awareness, April-May 2007, pp14-15. WasteMINZ, New Zealand.

Stuckey, M (2006) *Remediation of a groundwater N-plume utilising enhanced microbial degradation and phyto-remediation processes*. Presented at the Enviro06 Conference, Urban Groundwater Stream, Melbourne, May 2006.

Mulvey, P and Stuckey, M (2006) *Using source identification and fingerprinting to assess bioavailability changes with time during bioremediation*. Presented at the Bioavailability of Pollutants and Soil Remediation Conference, Seville, Spain, September 2006.

Stuckey, M (2006) *Remediation of soil and groundwater utilising enhanced microbial degradation processes, Point Nepean Road, McCrae, Victoria*. MSc (Groundwater Hydrology), Flinders University. Awarded High Distinction.

Stuckey, M and Vallely, L (1998) — *Organochlorine pesticide concentrations in the surface soil of Western Sydney former market gardens*. Presented at the ASSSI National Soils Conference, Brisbane, April 1998.